LARGE RANGE CLEARANCE ISSUES AND ANSWERS – THE KAHO'OLAWE EXPERIENCE

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Background

Kaho'olawe is the eighth largest Hawaiian island, with a size of approximately 45 square miles. The entire island was used by the United States as a target range for almost fifty years. Currently, a joint venture of Parsons and UXB has over 400 people working to clear the island of UXO in order to make it available for relatively safe and meaningful public use. The project is going well with over two-thirds of the island cleared of ordnance to date. Over 6 million pounds of range scrap and over 90,000 UXO items have been collected thus far.

The project has presented many technical and management challenges since its inception, because of both its sheer size and the unique geographical circumstances of its location. Many of these problems will likely be encountered on future cleanups as the size and number of UXO cleanups grow with increased public and local government awareness of the UXO problem. Also, many of the solutions implemented at Kaho'olawe are representative of trends in the UXO industry in general.

UXO Clearance Approach

Various approaches can be used for performing the actual UXO clearance work, depending on the size, schedule, and physical circumstances of the cleanup. Typically, smaller cleanups use teams comprised of EOD-qualified personnel who can perform all the functional steps involved in the cleanup process, such as vegetation removal, surface sweep, subsurface detection, excavation, demolition, etc. Larger cleanups with a long duration, such as at Kaho'olawe, can deploy specialized teams with different functions, using staff whose training and experience more narrowly match their functions. Other factors, such as site security or existing land use, also need to be considered when deciding upon the clearance process.

Geophysical Detection

Perhaps no other aspect of UXO clearance work has received as much attention from the research community as the science and technology of subsurface detection. Improvements in the ability to detect and characterize subsurface anomalies result in not only a reduced residual risk in the cleared land, but also decrease the rate of costly false positives. On Kaho'olawe, because the magnetically active soil proved to be a difficult challenge, the primary technology used for detection was electromagnetic induction.

Once the detection technology is decided, various options exist for how the detectors will be used. Both field discrimination (mag and flag) and data collection / post-processing have been used successfully on Kaho'olawe. Each has advantages and disadvantages that must be evaluated for each particular area of the site. Options also exist for combining multiple sensors on one platform and for tying in the detectors with GPS instrumentation.

Staffing Issues

Attracting and retaining the needed EOD and geophysical staff can be a problem because there are limited numbers of qualified personnel in each specialty. The site location and project duration have a significant impact on staffing issues. Wage rates, per diem (or lack thereof), the local cost of living, etc. are important factors to consider when putting together a compensation package for these professionals. Other staffing options exist such as the use of non-EOD staff, foreign nationals, and site-specific training. In using other staffing options, the keys to success are comprehensive training, careful qualification, adequate supervision, and effective quality control.

Data Management

Apart from cleared land, the most significant deliverable at the completion of a UXO clearance project is the data record of the work performed. A good data management system also provides an effective management tool for planning, monitoring, and reporting on the performance of the work. The foundation of the system must be a database application that serves as the repository of the site data. This database is preferably linked to a GIS application to allow users to visualize the physical relationship of the displayed information. Finally, a user-friendly interface helps the project staff, the client, and the public perform queries on the system to facilitate their work or satisfy their curiosity. The Kaho'olawe system consists of an Oracle Spatial database, GeoMedia GIS, and project-specific web-based interface.

Scrap Disposal

As mentioned above, the Kaho'olawe effort has already generated over 6 million pounds of range scrap, mostly fragments of expended ordnance, and has also already collected over 90,000 UXO items. In disposing of the range scrap, it is of critical importance that no UXO items inadvertently make it into the scrap waste stream. This is a highly visible issue in the current recycling industry due to several incidents over the last couple of years. The preferred approach is to assure 5X decontamination of the waste stream by arranging with a metals processor to maintain a chain of custody right to the smelter. This was not feasible for Kaho'olawe because of the remote location, and therefore a car-bottom furnace was brought to the island to thermally treat the range scrap on-island prior to shipment and co-mingling with other recycled materials.

Worker Morale

UXO clearance is difficult, dirty work. Even in the "paradise" location of Hawaii, the work is typically hot, dusty, and tedious, quickly leading to poor worker morale that manifests itself in low attendance, increased injuries, and low productivity. These problems are compounded on a large project such as Kaho'olawe with a multi-year, year-round schedule. Management needs to keep close contact with the work force, and needs to be proactive and relevant in responding to morale issues. On Kaho'olawe, we have tried to stay ahead of safety and productivity problems, implementing various incentive programs over the years to keep the workers focused.

Political Aspects

Almost every UXO project involves various groups of stakeholders with agendas that may or may not match those of the client. Because of the inherent risk to the public, UXO projects are always highly visible undertakings that attract the attention of neighborhood groups, environmental activists, local agencies, etc. They may involve Native American or other indigenous groups. These various interest groups can cause many distractions, throw up roadblocks, and in other ways impede the performance of the work. It is absolutely critical that stakeholders be included in a partnership relationship right from the start of the project.